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Three small genera of *Boraginaceae-Boraginoideae* revisited

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A b s t r a c t: The genera *Huynhia*, *Ulugbekia* and *Thamatocaryon* are retained. For *Ulugbekia*, an emended description is given. *Thamatocaryon dasyanthum* (CHAMISSO) I.M. JOHNSTON and *Th. sellowianum* (CHAMISSO) I. M. JOHNSTON are separate species the differences of which are described. The three species of the genus are compared to each other in a key for identification.

In the course of a general reconsideration of generic limits within *Boraginaceae-Boraginoideae* it seemed necessary to react to a few changes proposed in more recent publications by various authors. An attempt is made to reevaluate arguments influenced by personal convictions of various authors by necessity on the basis of a broader knowledge of the family as a whole. The first two genera treated here are both derived from *Arnebia* and/or *Lithospermum*. Both have been merged in *Arnebia* in recent accounts of the family for modern floras but should be kept separate in the present author's opinion. The third, *Thamatocaryon*, has a long taxonomical history that is reviewed here. There are also some problems on the specific level that are discussed in some detail.

1. *Huynhia* GREUTER, Willdenowia 11(1): 37 (1981)

Huynhia GREUTER was given as a new generic name to *Arnebia pulchra* (ROEMER et SCHULTES) EDMONDSON = *Echioides longiflorum* (C. KOCH) I.M. JOHNSTON instead of *Echioides* ORTEGA which is an illegitimate synonym of *Nonea* MEDIKUS, and *Aipyanthus* STEVEN, another legitimate synonym of *Nonea*, according to EDMONDSON (1977) and GREUTER (1981). DAVIS, MILL & KIT TAN (1988) are wrong therefore in their assumption that

Huynhia is a new genus. Greuter, l.c., overlooked the fact that different height of insertion of the filaments in the corolla is also found in true *Arnebia* FORSSKÅL and unsuitable therefore as a distinguishing character from that genus (including *Macrotomia* DC.). The style in *Huynhia* is not actually divided as in *Arnebia*, the stigma, however, is profoundly bilobed. This difference is more of a quantitative than a qualitative nature, therefore. Whether differences in pollen morphology together with this quantitative difference are sufficient for a separate genus or not will certainly depend on each author's personal opinion. Separation from the bulk of *Arnebia* species is necessary beyond doubt and can be achieved either on the generic or infrageneric level. In the latter case, a fairly complicated hierarchical order has to be observed, as annual and perennial species, those with and without a distinct nectary, those with a simply forked and a twice forked style, etc., also have to be united in groups at a lower level. For convenience's sake I prefer to regard *Huynhia* as a separate, monotypic genus with *H. pulchra* (ROEMER et SCHULTES) GREUTER et BURDET as its only species.

2: *Ulugbekia* ZAKIROV, Flora Uzbekistanica V: 632 (1961)

The monotypical genus *Ulugbekia* was created by ZAKIROV (1961) for *Lithospermum tschimganicum* B. FEDTSCHENKO. He compares it with *Lithospermum*, from which it is different by corollas without faecal appendages and the insertion of the filaments on the anthers ("antheris mediofixis"). From *Rhytispermum* LINK (now *Buglossoides* MOENCH) it is different by a nearly lacking basal ring in the corolla and the position of the stamens in the throat. The shining nutlets are nearly smooth, punctulate and sometimes slightly foveolate. There are 5 longitudinal folds in the throat of the corolla bearing glands and protracted deeply into the tube. According to JOHNSTON (1952) and my own observations, the glands are only few in number and irregularly scattered. The position of the stamens is not the same in every plant. There are specimens with stamens low and others with stamens very high in the corolla tube, but the length of the style may vary independently of their position. It is not possible to speak of true heterostyly as has been done by ZHU (1982). Long and short styles both occur in flowers with low positioned stamens contrary to what ZHU says. An up to now unique feature is the division of the style together with the shape of the

stigmas which has been described in a misleading way by JOHNSTON (1952). The style is widening in its upper part without separating into two branches, though the vascular bundles are distinctly divaricate, and crowned by a cross-shaped disc. This disc partly consists of stylar tissue and partly of 4 stigmas: the style is twice bifid with very short branches at right angles with its undivided part. The stigmas are separated from the stylar branches in a very inconspicuous way and sometimes nearly pendulous. ZHU'S, l.c., description of a bifid style with each branch bearing a bipartite stigma does not apply to our plant, therefore. The fact that the pollen grains are the same in all plants is another argument against true heterostyly. While the yellow corolla is similar to that of *Arnebia* (sect. *Macrotomia*) to which the species has been transferred by ZHU, the pollen much better agrees with *Lithospermum* as do the nearly smooth nutlets. In *Arnebia*, the pollen grains are constricted in the middle and there are two series of pores each starting at one of the poles, while in *Ulugbekia* the single series of indistinct pores is situated in the middle of the ellipsoidal grains (for *Arnebia* cf. JOHNSTON 1954).

JOHNSTON (1952) stresses the fact that closest affinities are with American species of *Lithospermum* apart from the shape of the corolla. A very unusual feature unique to the genus is the shape of the filaments though it is not the same in all flowers according to JOHNSTON, l.c. They are at least sometimes strongly compressed laterally from a wider base, curved and percursed by an excentric vascular bundle.

For all these reasons, ZAKIROV'S generic description should be emended in the following way:

Ulugbekia ZAKIROV, descr. emendata:

Corolla flavescens, regularis, annulo nectarifero et appendicibus faecalibus carens, plicis 5 longitudinalibus sparse glandulosis ut faux percursa. Stamina paulo supra basin vel sub fauce inserta, filamentis saepe lateraliter compressis, basi paulo dilatatis, curvatis, nervo unico excentrico percursis, antherarum medio infixis insignia. Stylus longitudine variabilis, apice bis bifidus ramis brevissimis horizontaliter patentibus una cum stigmatibus inconspicuis discum cruciformem formantibus. Nuculae sublaeves, parce punctulatae et interdum indistincte foveolatae, nitidae. Grana pollinaria serie unica porarum valde indistincta ad medium ornata, ellipsoidea.

Species adhuc unica: *Ulugbekia tschimganica* (B. FEDTSCHENKO) ZAKIROV
Specimen visum: Uzbekistaniae prov. Fergana, dit. Kokand, ad locum Al-
malyy prope ostium fl. Dzhau-Pai. CZUKAEVA, 14.6.1913. Herb. Fl. URSS
3560.

3. *Thaumatocaryon* BAILLON, Bull. Mens. Soc. Linn. Paris 839 (1890)

Since it has first been described by Baillon, *Thaumatocaryon* has been interpreted in very different ways by different authors. Its type-species, *Th. hilarii* BAILLON, is a synonym of *Th. tetraquetrum* (CHAMISSO) I. M. JOHNSTON based on *Anchusa tetraquetra* CHAMISSO (1833). DE CANDOLLE (1846) had included *Anchusa tetraquetra* in MEISNER'S genus *Antiphytum* where it remained until 1924 when I.M. JOHNSTON separated it again and took up BAILLON'S genus. In 1929, BRAND transferred it to *Moritzia* together with *Antiphytum* as a whole without explaining sufficiently his reasons for the particular case. Two other species included by JOHNSTON (1924) in *Thaumatocaryon*, *Th. sellowianum* (CHAMISSO) I.M. JOHNSTON and *Th. dasyanthum* (CHAMISSO) I.M. JOHNSTON had been transferred to *Moritzia* DC. ex MEISNER already by FRESENIUS (1857) under the names *M. sellowiana* (CHAMISSO) FRESENIUS and *M. dasyantha* (CHAMISSO) FRESENIUS respectively. As Brand had been the last author to propose a nomenclatural change, L.B. SMITH (1970) followed his example. He allows the status of a section (?) for *Thaumatocaryon* and gives a very good key, but takes *M. sellowiana* as a synonym of *M. dasyantha*. JOHNSTON had dealt with the group fairly often, in 1923 (under *Antiphytum*), 1924, 1927 and 1935 (under *Thaumatocaryon*)

The most important difference between *Moritzia* and *Thaumatocaryon* is the shape and position of the attachment scar. While true *Moritzia* has a fairly large, basal areola, that of *Thaumatocaryon* is situated on a short, subbasal stalk on the inner surface of the nutlet and is very small. This alone should be sufficient for generic segregation, if the same measure is applied throughout the whole family. *Pseudomertensia* and *Trigonocaryum* are defined by the same character which also has been used quite recently to separate *Austrocynoglossum* R. R. MILL from *Cynoglossum*. There are also additional peculiarities such as hooked hairs on the calyx of *Moritzia*, straight, pointed hairs on that of *Thaumatocaryon*. The whole habit is diffe-

rent as a consequence of heterophylly in *Moritzia*. All these differences are mentioned by SMITH, l.c. Less important is the presence of bracts in *Thaumatocaryon* and their absence in *Moritzia*. The only important characters they have in common is degeneration of three ovaries at an early stage so that only one mature nutlet is developed, and a shortly toothed calyx that is not divided to the base. By these characters they are also distinguished from *Antiphytum*. Reduction in the number of nutlets is fairly widespread. *Phyllocara* GUSULEAC, for instance, cannot be kept distinct from *Anchusa* though only one fertile nutlet is developed. If we take *Antiphytum*, on the other hand, there are always 4 nutlets. Their attachment may be the same as in *Thaumatocaryon*, though it is variable in this respect. If *Thaumatocaryon* is reduced to synonymy, it could only be under *Antiphytum*, not under *Moritzia*. It should be kept in mind that *Thautatocaryon* was merged into *Moritzia* by BRAND as a part of *Antiphytum*, not as a separate genus. Personally, I prefer to keep *Antiphytum* and *Thaumatocaryon* apart as genera in their own right following JOHNSTON (1924).

Obviously, JOHNSTON (1927, 1935) had not seen CHAMISSO's original description and recognized some of the details mentioned by this author. For this reason, his conclusions seem to be erroneous in several respects. BRAND (1929) had already neglected a number of important characters, though CHAMISSO'S diagnoses are very clear and leave little room for free interpretations. I am not sure whether the specimen of *Th. dasyanthum* examined by JOHNSTON really had been the isotype. It seems strange that he described the hairs on the faecal appendages - horizontal plaits as he called them more aptly - of both *Th. dasyanthum* and *Th. sellowianum* in exactly the same words in 1927, as they are very different, indeed. From BRAND'S notion that typical *Th. dasyanthum* seems to be very rare and is only known from the type collection I am inclined to assume that JOHNSTON saw two slightly different collections of *Th. sellowianum*. On the other hand, the relation corolla tube/calyx in length is given correctly, so that his other statements remain mysterious.

I could examine two collections which display the characters stressed in CHAMISSO'S original description very clear and show such a number of differences that one can reasonably claim specific rank for each of them. For what I consider to be true *Th. dasyanthum*, a specimen from Brazil, Rio

Grande do Sul: Taim besinho prope San Francisco de Paula, 18. December 1950, leg. B. Rambo S.J., Herb. Inst. Miguel Lillo, Tucuman is selected as a basis for my description, for *Th. sellowianum* another specimen from Rio Grande do Sul, Neu Württemberg, Kamp Ismilindro, 3. X. 1906, leg. A. Bornmüller n. 752 already cited by Brand.

While in the former basal leaves are still present in a small rosetta at flowering time, all the basal leaves have already vanished in the latter, and also part of the lower stem leaves is lost. The stem is ascendant, less hairy in the lowermost parts, angled and nearly winged sometimes (as mentioned already by CHAMISSO) in *Th. sellowianum*, while in *Th. dasyanthum* it is erect, equally hairy and terete throughout. Obviously, there are proliferating underground shoots in *Th. dasyanthum*, and leaf rosettae are formed at their nodes, from which the flowering stems also arise. In *Th. dasyanthum*, the cymes are looser and consisting of a greater number of flowers than in *Th. sellowianum* (may be variable and unreliable therefore). The corolla tube is distinctly longer than the calyx (1 1/2 times) in *Th. dasyanthum*, shorter or equal in *Th. sellowianum*. The inner side of the lobes of the corolla limb is papillate in *Th. dasyanthum*, nearly glabrous in *Th. sellowianum*. There is a horizontal band of short, soft hairs in the corolla throat in *Th. sellowianum*, while in *Th. dasyanthum* there are fascicles of hairs surpassing the anthers, the longest in the centre of each fascicle. CHAMISSO writes of this for *Th. sellowianum*: "Faux fornibus <JOHNSTON'S 'horizontal plaits'> munita parvis et maxime villosis", for *Th. dasyanthum*: "Faux barbata, vestigis fornicum in marginem confluentibus angustum, villoso-barbatum". There are also hairs on the inner side of the limb apart from the fascicles. The shape of the corolla is "hypocrateriformis" in *Th. sellowianum* according to CHAMISSO and my own observations, "infundibuliformis" in *Th. dasyanthum*. A minor difference that nevertheless should be mentioned is found in the hairs of the leaves. They are denser in *Th. dasyanthum*, and not surrounded by any particular type of cells at base, usually appressed. In *Th. sellowianum*, their bases are surrounded by larger, convex, translucent cells similar to those in *Onosma* and other genera; these cells are usually arranged in two circles. While I have not seen any intermediates, I cannot deny their existence as postulated by JOHNSTON (1935). Nevertheless, from my own observations I prefer to regard the two species as different for the present. The following key will help to identify the three species of *Thaumatocaryon* more easily:

- 1 Leaves oppsite *Th. tetraquetrum* (Syn.: *Th. hilarii* BAILLON,
Th. bornmuelleri PILGER incl. var. *asperior* BORNMÜLLER)
- Leaves alternate 2
- 2 Tube of corolla about 1 1/2 times as long as calyx. Throat inside with fa-
 scicles of longer and equally distributed shorter hairs extending into the
 limb *Th. dasyanthum*
- Tube of corolla shorter than or equalling the calyx. Throat of corolla with
 villous hairs on horizontal plaits *Th. sellowianum*

Zusammenfassung

Die Gattungen *Huynhia*, *Ulugbekia* und *Thaumatocaryon* werden aufrecht erhalten. Für *Ulugbekia* wird eine emendierte Beschreibung geliefert. *Thaumatocaryon dasyanthum* (CHAMISSO) I.M. JOHNSTON und *Th. sellowianum* (CHAMISSO) I.M. JOHNSTON sind getrennte Arten, deren Unterschiede beschrieben werden. Die drei Arten der Gattung werden in einem Bestimmungsschlüssel einander gegenüber gestellt.

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